Abstract

Steel blocks for the manufacture of moulds for the injection moulding of plastics material or for the manufacture of metal-working parts having a thickness greater than 20 mm, of which the structure is completely martensitic or martensito-bainitic, of which the hardness is between 430 HB and 530 HB and of which the chemical composition comprises, in % by weight: $0.180\% \leq C \leq 0.40\%$; $Si \leq 0.8\%$; $Mn \leq 2.5\%$; $Ni \leq 3\%$; $Cr \leq 3.5\%$; $Mo + W/2 \leq 2.8\%$; $V + Nb/2 + Ta/4 \leq 0.5\%$; $Al \leq 0.4\%$; $Ti + Zr/2 \leq 0.1\%$; $0.0005\% < B < 0.015\%$; $S + Se + Te < 0.2\%$; $Pb + Bi < 0.2\%$; $Ca < 0.1\%$, the remainder being iron and impurities resulting from production, the chemical composition also satisfying the following equations: $3.2 \leq Tr \leq 9$; $85 \leq Dr \leq 95$; $U/Dr \leq 10.0$, wherein $Tr = 1.8xC + 1.1xMn + 0.7xNi + 0.6xCr + 1.6xMo^* + K$ wherein $K = 0$ if the steel does not contain boron and $K = 0.5$ if the steel contains boron; $Dr = 54xC^{0.25} + 24.5x(Mo^* + 3xV^*)^{0.30} + 1.58xMn + 0.74xNi + 1.8xSi + 12.5x(Cr)^{0.20}$; $U = 1600xC + 100x(0.25xCr + Mo^* + 4.5xV^*)$; $R = 3.8xC + 10xSi + 3.3xMn + 2.4xNi + 1.4x(Cr + Mo^*)$; $Mo^* + 3xV^* \geq 0.4\%$; $Mo^* = Mo + W/2$; $V^* = V + Nb/2 + Ta/4$ and $B \geq 1/3 \times K_1 + 0.5$ wherein $K_1 = Min\ (I^*;J^*)$; $I^* = Max\ (O;I)$; $J^* = Max\ (O;J)$; $I = Min(N;\ N-0.29(Ti+Zr/2-5))$; $J = Min\left(N;0.5\left(N - 0.52\,Al + \sqrt{(N - 0.52\,Al)^2 + 283}\right)\right)$.

Figures: none